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WORLD HEALTH ORGANIZATION
TECHNICAL REPORT SERIES

No. 526

WHO EXPERT COMMITTEE ON DRUG DEPENDENCE

Nineteenth Report

WORLD HEALTH ORGANIZATION
GENEVA

1973

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PRINTED IN FRANCE

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Geneva, 21-27 November 1972

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WHO EXPERT COMMITTEE ON DRUG DEPENDENCE

Nineteenth Report

INTRODUCTION

The WHO Expert Committee on Drug Dependence met in Geneva from 21 to 27 November 1972.

Dr T. Lambo, Assistant Director-General, opened the meeting on behalf of the Director-General and welcomed the members of the Committee and the representatives of the Secretary-General of the United Nations, the International Narcotics Control Board, and the International Council on Alcohol and Addictions. He noted that, without relaxing its attention to the identification of dependence-producing drugs that can produce individual, public health, and social problems, the World Health Organization has for several years devoted increasing attention to the drug taker and to the sociocultural and other environments in which drug taking occurs.¹ It is clear that markedly improved preventive and therapeutic approaches are needed. No single cause of drug dependence has been, or is likely to be, demonstrated; the factors involved are apparently multiple. For these reasons, it is important that steps be taken to increase substantially the available fund of basic information about (a) the patterns and extent of the nonmedical use of drugs, (b) the prevalence and incidence of various types of drug dependence, and (c) the personal, sociocultural, and other factors associated with beginning, continuing, and stopping the use of dependence-producing drugs. The last three World Health Assemblies have emphasized the importance of studies directed to these ends. It was therefore fitting that the Committee should be invited to assess ways in which the epidemiological approach could most usefully be applied to the study of problems in the field of drug dependence and to consider means of increasing the number and comparability of such studies.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 363; 1970, No. 460; 1971, No. 478; 1973, No. 516.

PART I

WORK OF INTERNATIONAL BODIES CONCERNED WITH DRUG DEPENDENCE

Worldwide interest in drug dependence and the nonmedical use of drugs is shown by the activities of various international organizations. The Committee was pleased to note and comment on some of these activities.

1. World Health Organization

The Committee, having been informed of the means proposed by the Director-General¹ to provide "for the international collection and exchange of data on the prevalence and incidence of drug dependence, and on the human and environmental factors associated therewith"² and the steps taken to implement the programme expansion approved by the Twenty-fourth³ and Twenty-fifth⁴ World Health Assemblies, noted the increasing support being given to the programme by both the World Health Organization and the United Nations Fund for Drug Abuse Control. The Committee additionally noted the work of WHO expert groups⁵ and of the interregional training course and seminar for national programmes on problems of alcohol and drug dependence. It noted also the activities of the WHO Regional Office for Europe in the fields of prevention and control,⁶ health education,⁷ and epidemiology,⁸ and of the resolutions

¹ Director-General's report on drug dependence to the Twenty-fourth World Health Assembly, reproduced in: *Off. Rec. Wld Hlth Org.*, 1971, **193**, 59 (Annex 10)

² *Off. Rec. Wld Hlth Org.*, 1970, **184**, 22 (Resolution WHA23.42).

³ *Off. Rec. Wld Hlth Org.*, 1971, **193**, 32 (Resolution WHA24.57).

⁴ *Off. Rec. Wld Hlth Org.*, 1972, **201**, 33 (Resolution WHA25.62).

⁵ WHO Scientific Group on the Use of Cannabis (1971) *Report*, Geneva (*Wld Hlth Org. techn. Rep. Ser.*, No. 478); WHO Scientific Group on Opiates and their Alternates for Pain and Cough Relief (1972) *Report*, Geneva (*Wld Hlth Org. techn. Rep. Ser.*, No. 495); WHO Study Group on Youth and Drugs (1973) *Report*, Geneva (*Wld Hlth Org. techn. Rep. Ser.*, No. 516).

⁶ WHO Regional Office for Europe (1971) *Measures for the prevention and control of drug abuse and dependence*, Copenhagen (EURO 5412 IV, report on a Working Group); WHO Regional Committee for Europe (1971) *Prevention and control of drug addiction: summary report of technical discussions*. In: *Report of the twenty-first session of the Regional Committee for Europe*, Copenhagen (document EUR/RC 21/24 Rev. 1), p. 33.

⁷ WHO Regional Office for Europe (1973) *Health education programmes concerning drug abuse in young people*, Copenhagen (EURO 5418 IV, report on a Working Group) (in preparation).

⁸ WHO Regional Office for Europe (1973) *Epidemiology of drug dependence*, Copenhagen (EURO 5436 IV, report on a Conference) (in preparation).

on drug dependence adopted by the WHO Regional Offices for the Americas¹ and the Western Pacific.²

2. United Nations

The Secretary-General, acting on resolutions adopted by the United Nations Commission on Narcotic Drugs, the Economic and Social Council, and the General Assembly,³ has established a United Nations Fund for Drug Abuse Control (UNFDAC) to be made up of voluntary contributions to support short-term and long-term programmes for "concerted and simultaneous action on the supply of drugs for purposes of abuse, on the demand for such purposes and on the illicit traffic which serves as a channel connecting production with demand".⁴ The resolution invited appropriate United Nations bodies, specialized agencies, and other competent international organizations to cooperate fully in the planning and execution of measures and programmes in this field. The Fund is currently supporting not only selected national and regional activities designed to help reduce public health and social problems associated with the nonmedical use of dependence-producing drugs but also the work of United Nations bodies and specialized agencies in this field. Increasing support for such programmes is contemplated.

Recalling the previous observations and suggestions of the WHO Expert Committee on Drug Dependence on (a) the Draft Protocol on Psychotropic Substances and its later revised form,⁵ and (b) the classification, by level of control required, of selected psychotropic drugs not now under international control,⁶ the Committee noted that the Convention on Psychotropic Substances⁷ was, in large measure, in conformity with those suggestions. The special provisions regarding the control of preparations (Article 3), while not in accordance with the recommendations of the Expert Committee, were nevertheless a reasonable and practical approach to a difficult problem.

¹ Pan American Health Organization (1972) *Final Report PAHO Directing Council XX Meeting/WHO Regional Committee XXIII Meeting*, Washington, D.C. (Official document No. 111), p. 66 (Resolution XXV).

² WHO Regional Committee for the Western Pacific (1972) *Report of the twenty-third session of the Regional Committee, Guam, Manila* (Resolution WPR/RC23.R8, Drug dependence, summary records of the plenary sessions).

³ United Nations General Assembly. Resolution 2719 (XXV). In: *Official Records of the General Assembly*, Twenty-fifth Session, Supplement No. 28 (A/8028), p. 85.

⁴ Aide-mémoire accompanying the Secretary-General's letter of 26 March 1971 to governments announcing the establishment of the Fund.

⁵ *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 437, p. 9 (section 3); 1970, No. 460, p. 7 (section 2.2).

⁶ *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 437, p. 10 (section 4).

⁷ United Nations (1971) *Conference for the Adoption of a Protocol on Psychotropic Substances, Vienna* (Document E/CONF. 58/6).

The Committee, having been informed about the Protocol Amending the Single Convention on Narcotic Drugs, 1961,¹ expressed its satisfaction with:

(a) the broad intention to endeavour to limit the cultivation, production, manufacture, and use of drugs to the amount required for medical and scientific purposes (e.g., Articles 2, 9, and 11),

(b) the increased responsibilities and authority given to the International Narcotics Control Board to help achieve these ends (e.g., Articles 6, 7, and 11),

(c) the provision requiring Parties to “take all practicable measures for the prevention of abuse of drugs and for the early identification, treatment, education, after-care, rehabilitation and social reintegration of the persons involved” (Article 15), and

(d) the authorization of treatment, education, after-care, rehabilitation, and social reintegration in lieu of, or in addition to, conviction and punishment of drug-using offenders (Article 14).

The Committee noted with interest the resolution adopted by the United Nations General Assembly on youth and dependence-producing drugs, which, among other things, endorsed “the activities of the International Narcotics Control Board, the World Health Organization and other agencies, and their decision to redouble their efforts to control and combat drug abuse throughout the world” and requested the Secretary-General, in consultation with the specialized agencies concerned, to make a report to the Economic and Social Council at its fifty-third session on how the United Nations system can increase its effectiveness in the fight against drug abuse with special reference to the problems of youth in this respect.²

3. International Narcotics Control Board

The Committee was pleased to learn that, in addition to carrying out the responsibilities entrusted to it by existing international instruments, the International Narcotics Control Board had (a) begun the provisional implementation of the 1971 Convention on Psychotropic Substances, as recommended by the Economic and Social Council, a substantial number of countries having already furnished information relating to the substances covered by the Convention, (b) undertaken preparatory studies regarding

¹ United Nations (1972) *Conference to Consider Amendments to the Single Convention on Narcotic Drugs, 1961, Geneva: Final Act and Protocol* (Document E/CONF. 63/9).

² United Nations General Assembly. Resolution 2859 (XXVI). In: *Official Records of the General Assembly, Twenty-sixth Session. Supplement No. 29 (A/8429)*, p. 95.

the implementation of the 1972 Protocol Amending the Single Convention on Narcotic Drugs, 1961, and (c) undertaken a number of consultations, field missions, and recommended measures to improve the effectiveness of the international drug control system.

4. United Nations Educational, Scientific and Cultural Organization

The Committee learned with interest that the United Nations Educational, Scientific and Cultural Organization, utilizing funds made available by the United Nations Fund for Drug Abuse Control, was to convene a meeting in December 1972 at which experts on education in more developed countries would discuss means of preventing drug abuse in such countries. The recent decision¹ of the General Conference to urge the Director-General of that Organization to develop a programme for the prevention of drug abuse was noteworthy.

5. Council of Europe

Recalling the earlier activities of the Council of Europe in the field of drug dependence,² the Committee noted the continuing interest of the Council as manifested by its sponsorship in March 1972 of a Multidisciplinary Symposium on Drug Dependence. That symposium provided an opportunity for representatives of Member States and invited consultants to exchange views about problems associated with the use of dependence-producing drugs and to arrive at conclusions and recommendations that would assist Member States to increase the effectiveness of their individual and collaborative efforts.

6. International Union for Child Welfare

In August 1971, the International Union for Child Welfare held an extraordinary session of its expert group for delinquent and socially mal-adjusted children. Participants from 18 countries, representing primarily nonmedical disciplines concerned with problems of drug dependence, exchanged information on the differing approaches and methods being utilized in providing help to individual drug users. The Committee, recognizing the need for such interdisciplinary exchanges, was pleased to note that representatives of WHO acted as technical consultants during the meeting.

¹ United Nations Educational, Scientific and Cultural Organization. Resolution 1.202. In: *Records of the General Conference*, Sixteenth Session, vol. 1, *Resolutions*, p. 23.

² *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 460, p. 8 (section 2.5).

7. Inter-Parliamentary Union

The Inter-Parliamentary Union, at its Sixtieth Conference, adopted a resolution on drug abuse that, among other things, appealed to the parliaments of all nations to exert influence on their respective governments to take appropriate measures to limit the illicit cultivation and manufacture of dependence-producing and harmful drugs and to share technical knowledge on methods of prevention and treatment of drug addiction.¹

8. International Council on Alcohol and Addictions

The International Council on Alcohol and Addictions has continued to organize international and regional meetings of different types with the object of providing opportunities for the exchange of information and contact between professional workers in the field of alcohol and drug dependence. Attempts have been made to develop more intensive studies of particular problems by setting up research groups that meet during international conferences but continue their work by correspondence in the intervening period. These groups have discussed experimental research on acute alcohol intoxication, withdrawal, methadone maintenance, treatment of drug-using adolescents, behavioural therapy, and the epidemiology of drug dependence. Some of the groups have already published interim reports. The International Council on Alcohol and Addictions believes that such activity, by focusing on selected areas of study, can make an important contribution to the better understanding of these questions, with resulting advantages to national, regional, and local programmes.

9. Need for coordinated regional as well as global approach

The Committee reaffirmed the view expressed in the eighteenth report of the WHO Expert Committee on Drug Dependence² that, while it is desirable to implement a common international policy for controlling the production, manufacture, and distribution of certain dependence-producing drugs, a regional approach is more appropriate for policies designed to minimize the chances of potential users becoming interested in drugs and to foster effective treatment and rehabilitation programmes. The Committee noted with satisfaction that many of the activities of the various international bodies that it had been reviewing have been undertaken on a regional basis.

¹ Inter-Parliamentary Union (1972) *60th Conference, Rome, September 21-29, 1972. Resolutions, nominations, elections*, Rome, p. 8 (Resolution IV).

² *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 460, p. 8 (section 2.7).

PART II

EPIDEMIOLOGICAL STUDY OF DRUG DEPENDENCE

1. THE EPIDEMIOLOGICAL APPROACH

Bearing in mind the need to assess ways in which epidemiological approaches could be usefully applied to the study of problems of drug dependence, the Committee reiterated the statement contained in its eighteenth report that no single "cause" of drug dependence has been demonstrated (although many factors have been proposed as playing a part in beginning, continuing, and stopping the use of dependence-producing drugs) and that a knowledge of the pharmacological interaction between the drug and the organism and of the interaction between the organism and the environment is essential to an understanding of the nature of drug dependence.¹ The major hypotheses about the causes of drug dependence² may be classified under three headings: those concerned with the personality characteristics of the drug taker, those concerned with overt mental and/or physical disorders of the persons involved, and those concerned with sociocultural and other environmental factors. Various combinations of such nonspecific factors are probably involved in differing situations and localities. More information is needed about the factors associated with the use of dependence-producing drugs, as well as about the patterns and extent of such use, in order to plan and implement reasonably effective programmes for the prevention and management of the related problems.

Epidemiological approaches and methods have been used in studying a wide variety of diseases, disorders, and pathogenic phenomena ranging from infectious diseases to cardiac and pulmonary disturbances and including hereditary disorders, mental illnesses, delinquency, and accidents. These approaches and methods have been used (1) to determine the prevalence, incidence, and distribution of a condition or disorder in a defined population, (2) to determine the natural history of a disorder, (3) to clarify the etiology and the nature of modifying or precipitating factors, (4) to estimate the group and/or individual risk of developing a disorder, (5) to serve as the basis for policy or programme formulation, (6) to evaluate the effec-

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 460, p. 11 (section 3.1.1).

² *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 460, p. 12 (section 3.1.1).

tiveness of such policies and programmes in achieving their stated aims, and (7) to identify new syndromes.¹

Further information about most of the above aspects of the several types of drug dependence is a particularly urgent need in those localities and regions where the use of dependence-producing drugs results in individual, public health, and social problems. There are a number of considerations suggesting that epidemiological methods may be usefully applied to the study of drug dependence. For example, various types of drug dependence generally involve a minority of persons within most localities and age groups, suggesting that it should be possible to identify factors significantly associated with the development of these types of drug dependence. The existence of areas of high and low prevalence within a particular city offers similar possibilities. The social "contagiousness" of drug dependence and the importance of exposure and differences in vulnerability of those exposed are other features of drug-use phenomena that recommend the use of approaches initially adapted to the study of epidemics. Of perhaps greatest persuasiveness, however, is the undoubted multifactorial causation of drug dependence.²

Recognizing the potential value of epidemiological approaches to the study of drug use and dependence, the Committee considered that a review of such approaches and methods would be most appropriate and timely. Before embarking on the review, however, the Committee first considered the special problems presented by the application of epidemiological methods to the use of dependence-producing drugs and the extent to which these problems demand modifications in methodology and innovations in the approaches adopted.

2. SPECIAL PROBLEMS IN STUDIES OF DRUG DEPENDENCE

All health disorders have their unique characteristics, which it is part of the epidemiologist's task to help clarify. Drug dependence, however, presents the administrator and researcher with a number of special problems that are, in large measure, peculiar to this field.

2.1 Diversity of drugs, users, and environments

The epidemiologist views the specific profile of the drug-dependence phenomena in any community as involving interactions of drugs, users,

¹ See, for example, Morris, J. N. (1964) *Uses of epidemiology*, Baltimore, Williams & Wilkins; Reid, D. D. (1960) *Epidemiological methods in the study of mental disorders*, Geneva, World Health Organization (*Publ. Hlth Pap.*, No. 2); *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 365; 1972, No. 510.

² Hawks, D. V. (1970) *Bull. Narcot.*, **22**, No. 3, p. 15.

and environments. Each of these three factors presents extremely complex issues. For example, each drug has its particular profile of pharmacological effects, which vary with such factors as the amount, frequency, duration, and route of administration. Some of the conflicting findings in the literature regarding the adverse effects produced by a given drug can often be traced to differences in the pattern of use.

Not all users respond similarly to a given drug. These varied responses are due to the unique somatic and psychic make-up of different individuals and their particular reasons for taking dependence-producing drugs. For example, some persons may be more sensitive than others to a given drug, and the reactions of experienced adult users may be different from those of the novice. The reactions of a given person may also vary from time to time for a variety of reasons, such as changes in the level of tolerance and cross-tolerance, the degree of fatigue, and general mood. The increasing number of multiple drug users adds further complexity to the task of identifying the motives for and consequences of the use of different drugs.

The environmental factors are also complex. Various cultural and subcultural settings present differing social pressures relating to use of drugs. The identification and especially the quantification of these factors is a major task. The analysis and interpretation of their interactions is even more difficult.

2.2 Drug-seeking behaviour

Unlike most individuals with health disorders, those with drug dependence actively seek out the agent or drugs associated with the disorder. Even after experiencing damaging effects associated with the use of certain dependence-producing drugs, users frequently persist in seeking and taking drugs. Only rarely (e.g., with smokers and persons who contract venereal diseases) does the epidemiologist encounter such seeking behaviour on the part of the host. The motivations for drug use are complex; initially there may be simply curiosity, a wish to experience pleasure, or a willingness to accede to peer pressures. Other motivations, such as a desire to relieve or avoid anxiety, fear, or pain, may also be present from the outset. As drug use continues and dependence develops, still other forces may be involved, such as drug seeking as a conditioned response or to avoid the discomfort associated with drug deprivation (including the abstinence syndrome, when present).

Seeking behaviour adds complexity to the epidemiologist's search for the basic causes of drug dependence and for means of preventing or controlling its spread. For many disorders, once the disease-producing agent is identified and its mode of transmission understood, reasonably

effective prevention and control strategies become obvious. Such is not the case with drug dependence, which requires further study of the motives for drug seeking and of the role of personality factors and sociocultural pressures.

2.3 Economic profit

Drug dependence differs from other health disorders in the way that economic profit may operate to promote the spread and continued use of drugs. There may, for instance, be resistance on the part of producers, manufacturers and governments to relinquishing known sources of income. Economic profit in illicit drug trafficking needs no elaboration. This factor must be considered by the epidemiologist because it brings man's intelligence and technical skills to the task of promoting and maintaining this disorder against the best efforts of those who plan and implement programmes for the prevention and control of drug use. Profits from illegal drug trafficking may be used to corrupt law-enforcement officers and other personnel and thereby impair the effectiveness of control systems.

2.4 Emotional factors

The use of dependence-producing drugs is frequently seen as socially unacceptable behaviour for many reasons, including perceived threats to the welfare and morality of youth and to existing value systems. Thus, it is inherently an emotionally charged and controversial subject, and emotional reactions may at times make it difficult for research workers to obtain cooperation for certain types of studies.

A related source of difficulty is the existence of different attitudes towards the use of dependence-producing drugs in different societies and often within the same society. Such use may be variously defined as a disease, a vice, a crime, or as sanctioned social practice, depending on the sociocultural setting. These differing, and often emotionally charged, social attitudes can affect the epidemiologist's objectivity because he may be influenced by his own society's views on drug use.

2.5 Involvement of numerous disciplines and agencies

Epidemiology can proceed with one of its traditional tasks—that of describing the distribution of a disorder or behavioural trait within a population (and the variations in such distribution with time)—only if there is agreement on what constitutes a “case”. Providing an answer to that seemingly simple question in the field of drug dependence often

requires the talents of a number of disciplines. Is a "case" to be defined simply in terms of the degree to which the quantity and frequency of an individual's drug use exceeds the norm? Or is it to be defined in terms of his dependence on the drug or in other ways? Once a case is defined, a variety of additional disciplines are necessary to provide treatment, including rehabilitation services.¹

When one turns to more analytical studies intended to illuminate etiology or identify new syndromes, yet other disciplines are required, such as cultural anthropology, criminology, ecology, economics, education, general medicine, history, pharmacology, psychiatry, psychology, sociology, and statistics. Additionally, in collecting the data necessary for such studies, the research worker must enlist the cooperation of many other persons, such as representatives of the clergy, the courts, the law-enforcement agencies, and the welfare services.

2.6 Social disapproval and legal controls

The nonmedical use of most types of dependence-producing drugs is regarded with some degree of disapproval in nearly all countries. Legal sanctions against behaviour associated with drug taking are almost universal. Thus, persons who take certain dependence-producing drugs often tend to conceal and deny such activity. This tendency on the part of drug users hinders the epidemiologist's efforts to identify cases and collect data. Indeed, case-finding activities may even expose the personnel involved to personal danger.

The responsibilities of various official agencies for different aspects of the management of problems associated with the use of dependence-producing drugs are ordinarily defined by laws and regulations. The assignment of responsibility is affected by social attitudes towards drug taking. In some countries, the responsibility both for controlling the availability of drugs and for managing drug users is assigned largely to enforcement and penal agencies. In other societies, health and welfare agencies are given the major responsibility for the treatment and management of most drug users. The nature of the information in an agency's case records varies with its basic orientation. In those societies in which health agencies are assigned major responsibility, the epidemiologist has an opportunity to function in the health setting for which his methods were originally designed. Congruent goals and traditions on the part of research workers and collaborating agencies facilitate data acquisition, access to subjects, and the opportunity to launch and evaluate intervention experiments.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 363, p. 12 (section 1.2).

3. TERMINOLOGY

The Committee accepted the following definitions and usages for the purposes of its report.¹

Drug dependence. A state, psychic and sometimes also physical,² resulting from the interaction between a living organism and a drug, characterized by behavioural and other responses that always include a compulsion to take the drug on a continuous or periodic basis in order to experience its psychic effects, and sometimes to avoid the discomfort of its absence. Tolerance may or may not be present. A person may be dependent on more than one drug.

Psychic dependence. A condition in which a drug produces "a feeling of satisfaction and a psychic drive that require periodic or continuous administration of the drug to produce pleasure or to avoid discomfort".³

Physical dependence. "An adaptive state that manifests itself by intense physical disturbances when the administration of the drug is suspended... These disturbances, i.e., the withdrawal or abstinence syndromes, are made up of specific arrays of symptoms and signs of psychic and physical nature that are characteristic for each drug type".³

Drug control. National law or international agreement governing and restricting production, movement, and use of a drug to medical and scientific needs in the interest of public health and for the prevention of drug abuse.

Dependence-producing drug. A drug having the capacity to interact with a living organism to produce a state of psychic or physical dependence or both. Such a drug may be used medically or nonmedically without necessarily producing such a state. The characteristics of a state of drug dependence, once developed, will vary with the type of drug involved. Some types of drug, including those present in tea and coffee, are capable of producing drug dependence in a very broad sense. The existence of such a state is not necessarily harmful in itself. There are, however, several types of drug that, because they can produce substantial central nervous stimulation or depression, or disturbances in perception, mood, thinking, behaviour, or motor function, are generally recognized as having

¹ The explanations given for the terms "drug dependence" and "drug control" are taken from *Wld Hlth Org. techn. Rep. Ser.*, 1969, No. 407, p. 6. Those for the terms "dependence-producing drug" and "nonmedical use of drugs" are taken from *Wld Hlth Org. techn. Rep. Ser.*, 1973, No. 516, pp. 8 and 9.

² The Committee believes there are some situations in which physical dependence may occur in the absence of significant psychic dependence. This view was also noted in the fourteenth report of the WHO Expert Committee on Mental Health (*Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 363, p. 8).

³ Eddy, N. B., Halbach, H., Isbell, H. & Seevers, M. H. (1965) *Bull. Wld Hlth Org.*, **32**, 723.

the capacity, under certain circumstances of use, to produce individual and public health and social problems. Drugs of the types listed below can produce substantial effects and problems of the kinds mentioned above. As used in this report, the term "dependence-producing drug(s)" means one or more drugs of the following types:¹

(1) alcohol-barbiturate type – e.g., ethanol, barbiturates, and certain other drugs with sedative effects, such as chloral hydrate, chlordiazepoxide, diazepam, meprobamate, and methaqualone;

(2) amphetamine type – e.g., amphetamine, dexamphetamine, methamphetamine, methylphenidate, and phenmetrazine;

(3) cannabis type – preparations of *Cannabis sativa* L., such as marihuana (bhanga, dagga, kif, maconha), ganja, and hashish (charas);

(4) cocaine type – cocaine and coca leaves;

(5) hallucinogen type – e.g., lysergide (LSD), mescaline, and psilocybin;

(6) khat type – preparations of *Catha edulis* Forssk;

(7) opiate type – e.g., opiates such as morphine, heroin, and codeine, and synthetics with morphine-like effects, such as methadone and pethidine; and

(8) volatile solvent type – e.g., toluene, acetone, and carbon tetrachloride.

Nonmedical use of drugs. The use of dependence-producing drugs of the types noted above other than when medically indicated.

Epidemiology. The study of the distribution of a disease or condition in a population and of the factors that influence that distribution.

Incidence rate. The rate at which illnesses or other conditions develop during a defined period in a population at risk.

Prevalence rate. There are two indices of prevalence:

(a) point prevalence – the number of cases at one point in time in relation to a defined population;

(b) period prevalence – the number of cases existing during a period of observation expressed in relation to a defined population.

*Central case register.*² A formal record of defined "cases" maintained by a "central" agency. A "case" may be, for example, a patient with

¹ For a more complete discussion see Eddy, N. B., Halbach, H., Isbell, H. & Seevers, M. H. (1965) *Bull. Wld Hlth Org.*, 32, 721.

² *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 365, p. 11 (section 3).

a diagnosed illness, a person presenting designated signs or symptoms, or someone who has exhibited a particular behaviour, such as taking dependence-producing drugs, or been involved in a particular incident, such as being arrested. To add cases to such a register, it is necessary that one or more individuals or institutions report specified information to another (central) agency. The central case register may contain limited or more detailed information about the person or "case" in question. The data included must be recorded in standard form. The records of a treatment centre or an individual researcher are not considered to constitute a central case register.

Problem. A phenomenon that is judged by some agent or agency as producing or being capable of producing harm to or difficulties for an individual or society, whether or not there is a scientific basis for the opinion. It may later be demonstrated that the phenomenon is or is not capable of producing the presumed harm or difficulties. Conversely, there are phenomena that are capable of producing harm or difficulties, although this has not yet been perceived (e.g., the heavy smoking of cigarettes before such activity was recognized as a health hazard).

4. APPROACHES AND METHODS

4.1 General

Epidemiological approaches and methods, as applied to problems associated with the nonmedical use of dependence-producing drugs, may be considered under three broad headings: those intended to describe the magnitude and extent of the problems, those intended to clarify etiology, and those intended to evaluate the effects of programmes for the prevention or control of such problems. In all these approaches, case definition and ascertainment are of crucial importance.

The Committee noted that when new data are to be gathered, the epidemiologist has an opportunity to establish the definitions, criteria, and means of measurement that he will use in making observations about the presence or absence of the phenomena in which he is interested. This makes it possible for a number of workers to agree in advance on the definitions and criteria that they will use in a collaborative effort and for an independent worker to adopt those used by a number of others when such a procedure will not only serve his purpose but enhance the usefulness of the data. On the other hand, the lack of common definitions and criteria often makes it difficult or impossible to compare one study with another.¹

¹ Berg., D. (1970) *Int. J. Addict.*, 5, 777.

In terms of precise and consistent definition, the concepts of "non-medical use of drugs" and "drug dependence" offer a particular challenge. While the definitions of these terms given in section 3 (Part II) cover a particular range of phenomena, they are not sufficiently specific to be useful in field surveys.¹ The Committee considered it desirable to obtain a wide variety of specified descriptive data relating to the use of dependence-producing drugs before deciding on the constellation of phenomena to be characterized by such terms as "drug dependence" or "excessive use of drugs". This procedure should ultimately lead to the development of empirically based, operational definitions.

Information on the following matters was considered important in this connexion.

4.1.1 *Patterns of drug use*

A pattern of drug use is a description of the nonmedical use of drugs in terms of the types of drugs taken, the quantity, frequency, and duration of their use, the route of administration (e.g., ingestion, inhalation, or subcutaneous or intravenous injection), and the circumstances of their use. The pattern may relate to behaviour over a long or short time span, but the time base selected should be specified. It is proposed that this relatively straightforward descriptive method be utilized in an attempt to obtain objective and quantifiable information on the way in which drugs are being used rather than to decide whether a particular pattern is "use", "misuse", "abuse", or the consequence of drug dependence. It would be most desirable to develop a number of simple objective field or laboratory tests² (for example of urine or saliva samples) to supplement psychological and other assessment methods. Analyses of this kind, using multiple sources of information on the habits of persons under study, might provide a means of checking the validity of various assessment techniques.

4.1.2 *Quantification of drug dependence*

Drug dependence, with its many sociocultural, personal, and drug variables, is an especially difficult concept to quantify. Physical dependence, in any of its forms, is easier to describe and measure than is psychic dependence. In view of these difficulties, it is suggested that the problem may be most usefully approached by assessing certain quantifiable aspects of drug use. These may conveniently be grouped under 5 headings that permit operational definition:

- (1) signs and symptoms associated with current drug use;

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 365, p. 16 (section 5).

² Such tests would indicate the recent use of certain drugs, but not necessarily "nonmedical use" or "drug dependence".

- (2) signs and symptoms associated with deprivation (withdrawal) of drugs, assessed by frequency and intensity of occurrence;
- (3) attitudes of users toward drug use and their perceptions of the worth of drugs;
- (4) degree of personal involvement in drug-taking behaviour;
- (5) degree of involvement with a drug-taking milieu.

Responses to questions on these 5 aspects may help to define the problems associated with drug taking and provide a basis for quantifying the presence and intensity of drug dependence.

4.1.3 *Adverse consequences of drug use*

In the operational approach suggested, a simple listing of occurrences of adverse effects is required. As far as possible, the intensity of the phenomena should also be recorded, and it is often useful to tabulate the frequency of occurrence of specific consequences within specified time periods. The check-list of possible consequences will vary in different cultures, age groups, sex groups, and so on. Certainly, however, the causes of all hospital admissions of known drug users should be obtained. Conditions specifically inquired about might include drug overdose, septicaemia, hepatitis, abscesses, various types of toxic psychoses, and abstinence phenomena. Some indication of the severity of the condition treated may be obtained (depending on the system of medical care prevailing in a country) by differentiating between inpatients in a hospital¹ and outpatients in a clinic or general practice. It must be recognized, however, that some persons with quite severe conditions may be officially "untreated" if cared for in informal settings, e.g., by people sharing the user's accommodation. Additional inquiry might be directed toward problems in school or job (e.g., inefficiency, dropping out, or dismissal) and difficulties in interpersonal relationships.

4.1.4 *Summary*

In sum, the approach to case definition suggested in this report consists in the collection of information on patterns of drug use, drug dependence, and adverse consequences of use. The latter may result from man-drug interaction (e.g., toxic psychoses) or man-society interaction (e.g., dismissal from job or school). While no one of these three sets of data can be used to identify drug dependence, the information acquired is relatively objective and quantifiable, and it is to be expected that studies on the relationship between the three areas will lead to the identification of further empirically based case syndromes.

¹ With such cases it is useful to note the length of stay.

The problems of case definition and ascertainment also arise when the research worker tries to make use of existing data sources such as death certificates, clinic records, or central case registers and finds that they are incompatible with the precise definitions and systems of measurement that he has developed. Agency records are usually maintained to serve the needs of the organization and not necessarily to provide assistance to the epidemiologist. In view of this type of difficulty, the researcher must be ingenious and cautious in the use of existing records. Since these data sources can often be of great value, it is important to develop guidelines for the organization of record systems and for the retrieval of data from them. The work of WHO on the standardization of psychiatric diagnoses—a part of its broader activities in connexion with the international classification of diseases¹—provides an illustration of the way in which developments may proceed. Recently, a proposal has been made to incorporate in the 9th revision of the *International Classification of Diseases* an expanded classification scheme for drug and alcohol dependence. The proposal also stresses the need for the multiple coding of diseases. This approach is a useful beginning, and it is to be hoped that similar classifications can be developed for other aspects of drug use.

4.2 Magnitude and nature of the problem

It is difficult to describe the magnitude and nature of drug use and dependence in populations because of the complexities of case ascertainment and because of differences in the definition and classification of drug-taking behaviour. Nevertheless, it is useful to have some estimate of the nature and extent of drug use in a community, and several methods and data sources can be helpful in developing such estimates.

4.2.1 Available sources of data²

Much epidemiological research is based on the use of available sources of data, e.g., death certificates, post mortem reports, and morbidity records. While these data are of established value in the study of many diseases, they are generally less useful in studies on the nonmedical use of drugs and drug dependence, primarily because of the special problems associated with drug use (Part II, section 2). There can be no assurance, without special studies, that any particular subgroup of drug users who come to the attention of investigators (e.g., those attending a clinic) is representative of all or a significant proportion of the total population of users (e.g.,

¹ World Health Organization (1967) *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, 1965 Revision*, Geneva.

² *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 365.

those within the area served by the clinic). Such a self-selected sample may be quite atypical of the total. These difficulties, which are by no means unique to drug dependence, are compounded by the constantly changing nature of the drug scene. Particular drugs may become fashionable among a certain subgroup, while another may be more involved with other drugs. Regional variations in use may be considerable even within one country, partly reflecting the kind of drugs available and partly reflecting other subtle and as yet unknown influences.

The major sources of data on drug use and dependence may be classified under the following headings.

Indicators of drug production and consumption

The International Narcotics Control Board provides annual reports on the licit production, export, import, and medical consumption of drugs controlled under international instruments for most countries of the world. Comparable data on illicit production and consumption are, of course, not available. However, the United Nations does receive and compile governmental information on illicit production, drug traffic, and seizures, as well as on known users. Data from certain countries may be fragmentary or lacking, and the criteria used for recording such data often vary from country to country. Despite these shortcomings, the reports have some usefulness from the epidemiological viewpoint in indicating possible long-term trends in the volume of trade in legally produced drugs and in indicating the regional availability of certain drugs for nonmedical use. The usefulness of these data is enhanced when they are related to other information concerning the use of the drugs in question.

Quite apart from international and national records on production and consumption, inquiries at regular intervals among hospital patients and outpatients have given information on the habits of drug users and changing patterns of drug use and have helped to alert other medical services and nonmedical agencies to new situations. In countries where a national health service exists, continuing surveys of prescribing practices give information on the current use of psychotropic drugs in therapeutics. A comparison between the quantity of drugs available and the quantity used therapeutically may reveal discrepancies, suggesting the magnitude of the use of such drugs without medical prescription.

Indicators of possible health effects¹

Studies of the morbidity and mortality associated with drug use afford an opportunity to estimate the magnitude of the problem associated

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 365, p. 2 (section 2).

with this behaviour. Traditionally, the epidemiologist approaches the study of mortality by reference to death certificates and autopsy reports. However, death certificates are of limited usefulness in studying the prevalence and incidence of drug dependence because death is only occasionally a direct consequence of drug dependence. While drug users may show higher than average death rates from such associated causes of death as suicide, homicide, and accidents, these causes of death cannot necessarily be considered as direct results of drug use. Similarly, drug users may have higher than average death rates from hepatitis and other complications related to the mode of drug administration, but these diseases are associated with drug-use behaviour and are not a direct result of the drug *per se*. However, alcoholism or drug dependence should be given on the death certificate as a contributory cause of death.

Formal systems of death certification do not exist in many parts of the world, but where they do it is possible to take advantage of the records in several ways. They may be used to determine whether drug users have a higher mortality rate than non-users and whether they show a different pattern of causes of death. The usefulness of death certificate studies is well illustrated in the study of alcoholism, since deaths from liver cirrhosis may be used to provide an indirect estimate of the prevalence of alcoholism in the population.¹ While no similar estimates can yet be made for other forms of drug use, it is not inconceivable that methods of making them may be developed as death certificate research in this area goes forward. Studies of the recorded causes of death of known alcoholics have also yielded useful information; for example, alcoholics have a mortality rate 2 to 3 times the expected rate and deaths from violence (accidents and suicide) are about 20 to 30 times the expected rate. Comparable studies with respect to known users of other drugs might likewise be useful.

Coroners' reports also are of substantial assistance in this field. One such approach is illustrated by the report of Cherubin et al.² on deaths among narcotic users in New York City. The cause of death assigned the vast majority of decedents in this group was acute and/or chronic narcotism. However, the immediate cause of death was often considered to be the result of idiosyncratic reactions to the intravenous injection of foreign materials with which the drugs were mixed and not to a pharmacological overdose of drugs *per se*.

In addition to these studies of mortality, other data sources are available for the study of morbidity. Thus, admission to general and psychiatric and other specialized hospitals may provide some indication of the nature

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1951, No. 42, Annex 2.

² Cherubin, C., McCusker, J., Baden, M., Kavalier, F. & Amsel, Z. (1972) *Amer. J. Epidem.*, 96, 11.

and magnitude of the morbidity associated with drug use. Clearly, these admissions data in no way yield a representative picture of the nature and extent of drug use in the community, since those admitted to hospitals are a highly selected subgroup drawn from the general drug-using population. Many factors may influence the admission of drug users to hospital. For example, it is quite possible that high rates of admission merely reflect such factors as a diminished supply of drugs in the community or changes in admission policy. Nevertheless, with care, admission data can provide useful information, especially when considered together with various other data drawn from the community. Other sources of morbidity data include records of drug clinics, registers of notifiable diseases (e.g., hepatitis), police records, central registers of drug users, and reports by selected physicians and student health services.

Indicators of the social consequences of drug dependence

A variety of data sources on the social consequences of drug dependence are available. For example, in the occupational sphere, records relative to absenteeism and payments of unemployment and sickness benefits are of interest. The school attendance patterns of young drug users and non-users can be examined by reviewing school records and interviewing teachers and school administrators. Records of welfare agencies providing care for dependent children or assistance with housing may also be useful. Police and court records may reveal trends in drug use. In utilizing all such records, particular attention must be given to the possible influence of announced or unannounced changes in the policies of the agency involved.

Informal indicators

There are other quite informal sources of information that may give exceptionally useful clues about actual or possible changes in local drug-use patterns. Among these are press reports (including the underground press), "street" rumours, information from active and former drug users, and changes in the nature, potency, and/or adulteration of "street" drugs.

None of the available indicators of production and consumption, morbidity and mortality, social consequences, or local happenings gives by itself an accurate measurement of the extent, distribution, or nature of the problem posed by drug use and dependence. Each of them, however, provides a part of the total picture. The challenge is to use as much ingenuity as possible to derive data from as many diverse and heterogeneous sources as possible and to integrate these various "bits and pieces" with great care.

4.2.2 *Central case registers*

Central case registers (Part II, section 3) have proved to be very useful tools in determining epidemiological factors, such as the prevalence or incidence of a disease, condition, or behaviour or the outcome of a disorder, with and without intervention. They have also proved helpful in achieving more effective control programmes and in preventing such occurrences as the multiple prescribing of methadone or other drugs for narcotic-dependent persons enrolled in maintenance programmes.

In efforts to estimate the magnitude of drug dependence in the community, central case registers can be of considerable use. However, it is difficult to maintain reasonably complete registers related to the taking of dependence-producing drugs because of the social disapproval and secrecy often associated with drug-taking, which make it difficult to obtain reliable data, and because of diagnostic problems — if diagnosis of drug dependence is a criterion for including a name in the register. The maintenance of a central case register is further complicated by the need to ensure the confidentiality of the contents of the register and of the sources of information (unless, of course, the information is a matter of public record). The risk of intentional or accidental disclosure is always present whenever such records are maintained.

Many people believe that the actual and potential difficulties of keeping central case registers in the field of drug dependence can in some circumstances outweigh the benefits to be obtained. When central case registers are kept, those responsible for their maintenance must stipulate the data to be requested, and the information obtained must, if possible, cover the nonmedical use of all dependence-producing drugs.

The usefulness of data maintained in central case registers can often be enhanced by record linkage¹—the bringing together of two or more separate documents or sets of information concerning a particular individual or family. Indeed, this process is often carried out to advantage even in the absence of a central case register. However, there are often difficulties in carrying out such procedures owing to lack of suitable identifying information, to problems of administration and definition, and to the fact that the problems associated with the confidentiality and security of records are compounded when record linkage is undertaken.

4.2.3 *Surveys*²

The prevalence of drug use and dependence in the population may be estimated not only from existing records and case registers but also by means of a community survey. Since prevalence estimates are generally

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 365, p. 14 (section 4).

² *Wld Hlth Org. techn. Rep. Ser.*, 1966, No. 336; 1967, No. 365; 1972, No. 510.

desired for large population groups in entire regions and countries, some form of sampling technique is usually needed. The basic strategy is to select a representative sample of the population and to count the number of persons using drugs of particular types in particular ways. This is a relatively expensive approach, but it offers the advantage of detecting cases in the general population that may never have come to the attention of official agencies or organizations. As previously noted, the major difficulties of this method are those of case definition and ascertainment. Also, in practice, it is rarely possible to select a representative sample¹ of the general population that will reflect the prevalence of drug dependence or the nonmedical use of drugs. Thus, a number of alternative, stratified samples may be necessary (e.g., of students, school-leavers, employed and unemployed persons, prisoners, and those involved in accidents).

Given the difficulty of identifying persons who take dependence-producing drugs, special case-finding approaches may be required to obtain reasonably accurate incidence and prevalence data. Several investigators² have developed casefinding strategies resembling those developed in connexion with venereal diseases, where initial case contacts are used to help the epidemiologist find other likely cases. This technique appears to be particularly suited to identifying narcotic-dependent persons because they are usually forced into frequent or continuous association with other users in order to maintain their supply of drugs.

4.3 Etiology

A good deal of epidemiological research is directed towards the identification of etiological factors in disease and behaviour. Important research strategies in this connexion include cross-sectional, retrospective, and prospective studies.

4.3.1 Cross-sectional studies

The cross-sectional survey is intended to provide information at a single point in time regarding the association between risk factors and a particular disease or condition. In this type of study, no attempt is made to test specific etiological hypotheses since the focus is on the relationship between the study variables and the prevalence of disease. In studying the nonmedical use of dependence-producing drugs, this approach has

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1966, No. 336, p. 4 (section 2); 1972, No. 510, p. 11 (section 3).

² Alarcon, R. de, & Rathod, N. H. (1968) *Brit. med. J.*, 2, 549; Hughes, P. H., Senay, E. C. & Parker, R. (1972) *Arch. gen. Psychiat.*, 27, 585; Kosviner, A., Mitcheson, M., Myers, K., Ogborne, A., Stimson, G. V., Zacune, J. & Edwards, J. G. (1968) *Lancet*, 1, 1189.

several limitations. The condition may be relatively uncommon in the general population, so that the likelihood of uncovering enough cases for study is low, and many drug users are reluctant to be identified. Furthermore, when cross-sectional information is obtained regarding the characteristics of users, it is difficult to determine whether the characteristics observed preceded, followed, or developed concurrently with drug-using behaviour. These surveys can be conducted relatively quickly and inexpensively, however, and often provide very useful information on potentially significant associations. Moreover, when they are conducted in representative samples of the community, they may serve not only to provide estimates of the prevalence of conditions in the population but also as a basis for selecting subjects for prospective and retrospective studies.

A frequent problem in interpreting cross-sectional and other etiologically oriented studies is the finding of statistically significant associations between drug-using behaviour and a variety of factors postulated to be of etiological significance. Questions arise concerning the relative importance of the factors and of differing combinations of them. There are a number of multivariate statistical techniques that may help to resolve this problem. The automatic interaction detector computer programme of Sonquist & Morgan,¹ for example, was used by Lanese et al.² to assign major importance to 3 factors influencing adolescent smoking behaviour from among 12 factors significantly associated with such behaviour.

4.3.2 Retrospective studies³

The retrospective approach is a particularly useful one in the study of diseases or conditions of low incidence. It involves the location of existing "cases", the selection of appropriate comparison groups, and the examination of past events or influences in relation to the present status of the subjects. Since cases are usually drawn from sources such as hospitals, clinics, prisons, or military groups, the degree to which they are representative of all the cases in the population is a matter of concern. The selection of appropriate comparison groups is essential but often difficult, since it is rarely possible to choose a control group that is entirely representative of the population from which the cases were chosen. The magnitude of this problem varies greatly according to the particular purposes of the study and other circumstances. When there is doubt regarding the choice of a control group, it is quite possible to select more than one control group from different sources.

¹ Sonquist, J. A. & Morgan, J. N. (1964) *The detection of interaction effects*, Ann Arbor, Survey Research Center, Institute for Social Research, University of Michigan (Monograph No. 35).

² Lanese, R. R., Banks, F. R. & Keller, M. D. (1972) *Amer. J. publ. Hlth.*, 62, 807.

³ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 510, p. 19 (section 5.1).

All retrospective studies are impaired by the inaccuracy of recall of past events, and these difficulties are especially severe in the field of drug dependence. However, the retrospective approach is less expensive and time-consuming than the prospective design. Like the cross-sectional approach, it does not permit the determination of time sequences among the factors being studied, since sample selection is made when the subjects are already affected. This is particularly troublesome in the study of drug use and dependence since the time sequence of associated factors is often of special interest. Thus, if it is found in a retrospective study that drug users have particular personality patterns, certain types of family relationships, specified job difficulties, and so on, it is impossible to tell whether these conditions or events preceded or followed the taking of drugs. Even if it could be determined that an observed characteristic developed after the subject began to use drugs, the assumption of a causal relationship would seldom be justified.

4.3.3 *Prospective (cohort) studies*¹

The classic prospective study involves the longitudinal study of a group or cohort initially free of the disorder in question. The potential etiological significance of factors initially studied can be assessed as disorders or events occur over a period of time among some members of the group. Since the characteristics of persons are studied prior to the occurrence of the disorder, the predictive usefulness of risk factors can be assessed in relation to the incidence of disease or other events. A distinction should be noted between the prospective (cohort) study, where those initially free of a disorder or particular behaviour are followed, and the follow-up or outcome study, where a group of affected persons is followed over a period of time. Certain aspects of the natural history of the use of dependence-producing drugs may be studied utilizing either method. While both approaches involve longitudinal study, the prospective study has traditionally been concerned with the study of risk and etiological factors and the incidence of disorders or events, while the follow-up study focuses on the consequences and course of disorders or events.

The prospective design has serious limitations in the study of conditions in which there is a relatively low incidence in the general population. In such circumstances, the researcher must either begin with an impractically large study group or follow a study group for an impractically long period of time. One way of increasing the yield of cases in this circumstance is to follow a population group known to be at relatively high risk. Thus, school drop-outs or persons from broken families might constitute groups in which the incidence of drug use might be expected to be higher

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 510, p. 19 (section 5.1).

than in the general population. Findings from this type of study are not, of course, representative of the general population.

While dependence on such drugs as hallucinogens, amphetamines, and opiates has a relatively low incidence in the general population of most countries, the incidence of alcoholism is often substantial. Moreover, in some countries, the incidence of experimental and recreational use of other dependence-producing drugs, such as cannabis and certain sedatives, is also substantial. Since drug use is a necessary precursor to the development of drug dependence, since the problems associated with drug dependence are so costly in both human and economic terms, and since prospective studies may be expected to enlarge our knowledge about the etiology as well as the incidence of drug taking and drug dependence, it is essential that increasing attention and support be given to such studies and to quasi-prospective studies of the type noted in the next section.

Prospective studies are expensive, laborious, and time-consuming. Before initiating them it is well to have available a fairly clear set of hypotheses that have been generated by previous observations and that now require prospective confirmation.

4.3.4 *Quasi-prospective (cohort) studies*¹

An interesting variation of the prospective study design is the contemporary survey of a cohort of persons selected from a high-risk group on the basis of information available from an earlier time. Thus, Robins & Murphy² studied a group of Negro men whose names were selected from elementary school records dating from 26 to 30 years previously. When interviewed as adults these men were asked about their use of marijuana, barbiturates, amphetamines, and opiates. The answers they gave as adults could then be analysed in relation to data available in the original school record. In this study, subjects were selected for investigation prior to their first exposure to drugs, and the findings could thus be considered predictive. This research design avoids some of the expense and time-lag associated with the classic prospective design, but great care must be taken to locate as many members of the cohort as possible. Since many years may have elapsed since the original records were prepared, the tracing of subjects can prove difficult. Drug users in particular are more likely than others to be missed owing to migration, death, or imprisonment.

4.4 Programme evaluation

Epidemiological approaches and methods have been useful in evaluating the effectiveness of health programmes, and it is to be hoped that they will

¹ Sometimes referred to as "retrospective longitudinal studies". See *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 510, p. 19 (section 19).

² Robins, L. N. & Murphy, G. E. (1967) *Amer. J. Publ. Hlth.*, 51, 1580.

also be helpful in evaluating policies and activities (interventions) intended to prevent or control problems associated with the nonmedical use of dependence-producing drugs and hence in facilitating the development of effective community and other intervention programmes. Some general approaches to intervention in drug dependence problems include (1) regulatory and enforcement practices to limit drug availability; (2) punitive measures and other sanctions against drug users; (3) treatment and rehabilitation of drug-dependent persons; (4) educational efforts to discourage drug use; and (5) the provision of attractive alternative activities to groups at high risk. The field trial¹ offers an opportunity to observe the effects of various intervention modalities in limited population groups prior to their more general application in the community. Such field trials or pilot studies can be of three general types: before-and-after studies, "natural experiments", and controlled field trials.

4.4.1 *Before-and-after studies*

In a before-and-after study, a community group is surveyed to establish baseline observations prior to the initiation of a health or other intervention policy or activity. At some later time, a second survey is undertaken so that post-intervention findings can be compared with the baseline observations. In this type of study, the investigator is often uncertain whether post-intervention changes can be attributed to the effects of the programme or to the effects of other unrelated events that might normally have occurred in the community with the passage of time. Clearly, it would be desirable to have available a control or comparison community so that the effects of these extraneous influences might be estimated, but it is usually difficult to achieve this ideal. With appropriate caution and adequate effort, however, this relatively straightforward approach is of substantial use in the evaluation of various types of intervention programme.

4.4.2 "Natural experiments"

A change of policy or programme often has observable consequences in the community and can therefore be regarded as a "natural experiment". Investigators taking advantage of these "natural experiments" can obtain useful information. An interesting example involving international comparisons is provided by the work of Terris,² which shows the divergent trends in the USA and the United Kingdom in mortality resulting from cirrhosis of the liver. Terris noted that these differences could be related to variations in drinking patterns, stemming from differences in national regulatory and tax policies.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 510.

² Terris, M. (1967) *Amer. J. publ. Hlth*, 57, 2076.

4.4.3 *Controlled field trials*¹

In the controlled field trial, persons or groups are allocated either to "treatment" or to "control" status. The treatment group is exposed to a specified intervention and the results are compared with those observed among the control or comparison group. This approach provides a relatively sound basis for drawing inferences regarding the effects of the intervention. However, experiments of this kind are difficult to conduct in natural community settings and there is always the chance that control persons or communities may be accidentally exposed to the intervention. Although such exposure may not necessarily invalidate the comparison, it may diminish its sensitivity. A related problem associated with the field trial is that usually only motivated persons are willing to participate in it and the findings are therefore not necessarily applicable to the general population.

5. SOME PRIORITY RESEARCH AREAS

In reviewing epidemiological approaches to the study of drug dependence, the Expert Committee emphasized the urgent need for increased research effort in four areas—etiology, ascertainment methods, evaluation methods, and natural history studies.

5.1 **Etiology**

Recognizing the limits of available knowledge and understanding of the causes of the nonmedical use of drugs and drug dependence, the Committee urged that further research be initiated to characterize those persons most vulnerable or susceptible to various forms of drug dependence. Such research should be broadly oriented and include work on (1) personality factors and coping skills, (2) responses to authority and control, (3) the personal and sociocultural contexts of attitudes and value-judgements relative to drugs, and (4) interpersonal relationships with special reference to peer, family, and friendship networks. It is to be hoped that the characterization of persons and groups at high risk of becoming drug dependent will lead to the development of increasingly effective strategies of prevention.

There should also be an increase in research on the ways in which sociocultural values and beliefs influence drug-taking behaviour. It is probable that the national and local cultural contexts within which dependence-producing drugs are used have an important bearing on the incidence, prevalence, severity, and consequences of drug dependence.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 510.

5.2 Ascertainment methods

The Committee considered that further research was needed to develop reliable and valid methods of describing events related to the nonmedical use of dependence-producing drugs and of defining cases of drug dependence within acceptable limits of sensitivity and specificity. The problems involved have been extensively discussed elsewhere in this report (e.g., Part II, sections 4.1 and 4.2). The availability of such methods would be most useful in monitoring trends in different communities so that new outbreaks or changes in patterns of use could be detected quickly and possible etiological factors identified.

5.3 Evaluation methods

In developing effective intervention techniques, it is essential that the costs and benefits of alternative approaches be systematically evaluated.¹ The challenge in this area is not only to envisage new and potentially more effective means of intervention but also to devise ways of designing intervention trials for assessing the effectiveness of measures before applying them widely.

Because of both a marked increase in concern about the seriousness of public health and social problems associated with the nonmedical use of dependence-producing drugs and an apparent increase in drug-taking behaviour in many parts of the world, many communities and countries have launched, or are preparing to launch, extensive and often expensive programmes for prevention, treatment, and control without prior or simultaneous evaluation of their usefulness. Such communities understandably believe that "something must be done". However, this is no reason not to undertake evaluative studies of what is being done or of what may be done in the future. Particularly is this so since there is evidence to suggest that some past policies and programmes may have been counter-productive. Further, programmes that may be effective in one sociocultural setting may be ineffective in another. Improved methodology is needed to facilitate the studies urgently needed in this field.

5.4 Natural history studies

Research on the natural history of the nonmedical use of dependence-producing drugs and drug dependence is of prime importance. Longitudinal studies that start from the identification of an already affected indi-

¹ McGlothlin, W. H., Tabbush, V. C., Chambers, C. D. & Kay, J. (1972) *Alternative approaches to opiate addiction control: costs, benefits and potential*, Washington, D.C., US Department of Justice (BNDD contract No. J-70-33, final report).

vidual rather than from an as yet unaffected group are useful in defining the natural history or evolution of the condition or behaviour once it has become established and the frequency of serious complications or death, but not necessarily the etiological factors involved (Part II, sections 4.3 and 5.1). One follow-up study of young people found to be dependent on drugs of the amphetamine type demonstrated the prognostic significance of specific aspects of their drug-taking behaviour. Similarly, follow-up studies of alcoholics have shown a high mortality among them from suicide and accidents as well as cirrhosis of the liver. In such mortality studies, the experience of the drug-dependent group can be compared either with that of a matched sample of persons not dependent on drugs or with the actuarial expectation based on national death rates for persons of the same age during the same period.

The natural history of drug dependence involves not only the man-drug interaction but also the man-society interaction, which stems largely from the drug user's being involved in socially unacceptable behaviour. For example, a drug user who is in the experimental, casual-use, or even dependent-use phase of drug taking may have experienced little, if any, personal harm from his pharmacodynamic interaction with a dependence-producing drug. However, if he is a student and is expelled from school for his behaviour and precluded from entering another school, his entire life may be adversely affected. This is not to say that he should or should not be expelled for drug-taking behaviour but that such expulsion is a significant event in the man-society sphere of interaction and is a part of the natural history of drug taking.

Studies on this subject will, it is to be hoped, enhance our understanding of such behaviour and yield insights leading to increasingly effective preventive and rehabilitation programmes.

6. COMPARABILITY

Comparability of research methodology is essential for the repeating of experiments, the accumulation of a systematic body of scientific knowledge, and the generalization of findings. That such comparability of method is urgently needed in the study of drug dependence is clearly revealed by the efforts of those attempting to summarize and synthesize available findings. One such review, prepared by Berg,¹ attempted to summarize and collate data on the nonmedical use of "dangerous drugs" from 69 surveys. This effort was severely hampered by the almost total lack of comparability among the studies at almost any level of abstraction. Thus, questionnaire items on drug use did not distinguish past from current

¹ Berg, D. F. (1970) *Int. J. Addict.*, **5**, 777.

drug use; "users" variously included the experimenter, the current user, the drug-dependent user, and the ex-user; sampling designs were diverse and non-comparable; official agencies varied enormously in their definitions of drug use; and methods of data collection ranged from personal interviews to "secret ballots". If advances in understanding are to be made, it must be possible for workers to compare observations, share findings, and discern repetitive and consistent patterns when they are present. For these reasons, comparability between studies in this field is an urgent priority. It is to be hoped that the utilization of existing, and the development of new, means of fostering such comparability will increase the ease with which collaborative research projects can be mounted. Collaborative projects often make it possible to add the data from a study in one locality to those obtained in another and thus to establish significant findings with greater speed than would otherwise be the case.

The methods of increasing the number, comparability, and usefulness of studies relating to the nonmedical use of dependence-producing drugs and drug dependence involve a variety of interrelated activities, which are discussed in the following paragraphs.

6.1 Development of comparable methods and systems of measurement

The Expert Committee considered that even if a modest beginning were made on the development of comparable methods and systems of measurement, much would have been accomplished. Thus, it would be a great advantage if comparable data were available on such relatively straightforward matters as the amount, frequency, duration, and route of administration of particular drugs now used or used in the past. Some precedent for this is available from work on cigarette smoking, where standardized questionnaires have been developed on the number and type of cigarettes smoked, inhalation, spacing, and so on. A brief, simple questionnaire on drug use would at least provide a beginning in a field where comparability is obviously very important but difficult to achieve. Simple questions might also be developed regarding attitudes and perceptions. In addition, of course, the questionnaire would cover such basic data as birth-date, sex, race, residence, education, and occupation. Obviously, progress on this problem would increase the likelihood of mounting effective programmes of national, cross-cultural, and international research.

To help foster the development of reasonably standard questions and other means of gathering comparable data, the Committee suggested that WHO should consider inviting selected institutions and investigators to keep the Organization informed about the progress of their work and to submit copies of such instruments or individual questions as they believe

might be helpful in developing standard methods for use by future investigators and record-keepers. With such information at hand, WHO would be in a position to facilitate communication between investigators as they develop their respective studies and to facilitate the development of standard methods. Such activities might be undertaken by WHO on a pilot basis to determine their usefulness and feasibility.

6.2 Development of precise terminology

The definitions offered in this and previous WHO reports will, it is hoped, provide a basis for the development of more precise terminology and more useful and uniform reporting systems. The need at present is to encourage the widespread use of more precise terminology in research work.

6.3 Collection and retrieval of data

A large body of data on the nonmedical use of dependence-producing drugs and drug dependence has been accumulating over the years. The need to organize these data in order to facilitate their retrieval was noted by the WHO Expert Committee on Addiction-Producing Drugs in 1957¹ and has been referred to repeatedly by subsequent Expert Committees. A number of information storage and retrieval systems already exist, including the "Classified archives of the alcoholism literature", at the Rutgers University Center of Alcoholism Studies, New Brunswick, N. J., USA, and the index of *The pharmacology of the opium alkaloids*.² Other sophisticated systems are being developed at the United Nations Narcotics Laboratory and in Canada, the United Kingdom, and the USA. To ensure an effective coverage of information sources and to avoid the duplication of work, it is important to improve the coordination of these various efforts.

The Committee considered that the convening of meetings of persons actively interested in systems for the storage and retrieval of data in the field might be an important means of stimulating coordination and co-operation.

6.4 Collaborative research

Another effective method of furthering comparability of work in this field is to use the well established mechanism of the collaborative project, in which investigators from different centres agree to participate in a joint

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1957, No. 116, p. 11 (section 11).

² Krueger, H., Eddy, N. B. & Sumwalt, M. (1941) *The pharmacology of the opium alkaloids*, Washington, D.C., US Public Health Service (*US Public Health Reports*, Suppl. 165), 2 vols.

research venture. Identical, or at least comparable, definitions and methods are developed in advance and agreed upon by the investigators. Methods would be further shaped and refined in the course of the study.

One important use of collaborative studies is to combine data from a number of sources in order to get a sample of sufficient size to permit meaningful statistical analysis. The clinical or other resources of a given centre may be too meagre to permit the collection of an adequate sample within a reasonable period of time. Thus, studies of high-risk groups and of those already dependent on drugs would immediately benefit from collaborative efforts.

It is conceivable that collaborative research would yield new standards for the conduct of both national and international research, as well as urgently required information on the causes and consequences of drug dependence in various parts of the world.

6.5 Promotion of research and training

Although there is an urgent need to increase substantially the available fund of knowledge about the causes and consequences of the nonmedical use of dependence-producing drugs, relatively few research personnel and centres are devoting themselves primarily to such studies and many other researchers and centres that are qualified to make contributions are engaged in only a relatively minor way owing to lack of time and motivation. For these reasons it is essential (1) to foster the development of additional specialized research and training centres, particularly in areas of the world where they do not now exist, (2) to increase the support available to certain of the existing specialized centres, (3) to enlist the interest and enthusiasm of strong nonspecialized research centres in devoting more of their resources to studies and teaching in this field, and (4) to provide an increasing number of fellowships to promising professionals who wish to gain special competence in the subject. It is important that behavioural scientists, clinicians, epidemiologists, statisticians, and others be involved in relevant research and training programmes. The Committee was of the opinion that WHO was in an advantageous position to assist in furthering the development of research and training activities.

6.6 Encouragement of working conferences

The comparability of approaches and methods permitting more informative comparisons and cross-cultural analyses would be encouraged by the convening of task-oriented workshop conferences involving a relatively small number of professionals from differing disciplines, each of whom can make a contribution to specific phases of research on the non-medical use of drugs and drug dependence. The purpose of these meetings

would be to focus on common approaches, methods, and instruments, to share experiences, and to pool data from different geographic regions and fields of competence. When appropriate, such groups might be asked to prepare reports on the results of their technical deliberations and even to assist in planning and conducting specific collaborative or other research activities. Among the tasks that might be assigned to one or more working groups is the formulation of suggested "standard" questions and instruments of the type envisaged in section 6.1 (Part II).

7. COMMUNICATION WITH POLICY-MAKERS

The ultimate purpose of carrying out epidemiological studies in the field of drug dependence is to develop knowledge that can serve as a basis for improved preventive, treatment, and control programmes. Existing and new knowledge about the epidemiology of drug dependence must be available to programme planners and policy-makers, and future research must address itself to pressing issues and questions faced by decision-makers. It is suggested that a series of small working conferences between epidemiologists, specialists in the field of drug dependence, and policy-makers might be convened to facilitate communication of the type noted above and to explore other ways of enhancing such communication.

PART III

INTERNATIONAL CONTROL OF INDIVIDUAL DRUGS

1. DIPHENOXYLATE PREPARATIONS

After considering a notification from the Government of Belgium under Article 3 of the Single Convention on Narcotic Drugs, 1961, and after reviewing the opinions of members of the WHO Expert Advisory Panel on Drug Dependence, the Expert Committee proposed that WHO should recommend to the Secretary-General of the United Nations that paragraph 3 of Schedule III annexed to the Single Convention on Narcotic Drugs, 1961, should be amended to read as follows:

Preparations of diphenoxylate containing, per dosage unit, not more than 2.5 mg of diphenoxylate calculated as base and a quantity of atropine sulfate equivalent to at least one per cent. of the dose of diphenoxylate.

The revised wording would not change the intent and substance of the paragraph but would be more convenient.

2. NICODICODINE

The Committee considered a notification from the Government of France requesting the transfer of nicodicodine from Schedule I to Schedule II of the Single Convention on Narcotic Drugs, 1961, accompanied by a request to revise the status of control of nicodicodine under the 1931 Convention. After considering also the relevant opinions of members of the WHO Expert Advisory Panel on Drug Dependence, the Committee concluded that nicodicodine is comparable to dihydrocodeine in its pharmacological activity and that it is liable to produce abuse patterns and ill effects similar to those of the drugs listed in Schedule II of the Single Convention. Moreover, nicodicodine is capable of conversion into dihydrocodeine, a substance listed in Group II of the 1931 Convention as well as in Schedule II of the Single Convention, 1961. The Committee was of the opinion that nicodicodine should be transferred from Schedule I to Schedule II of the Single Convention and that nicodicodine and its salts should from now on fall under the regime laid down in the 1931 Convention for the drugs specified in Article 1, paragraph 2, Group II of that Convention. It recommended that WHO should communicate these conclusions to the Secretary-General of the United Nations.

■ Preparations of nicodicodine compounded with one or more other ingredients containing not more than 100 mg of the drug per dosage unit and with a concentration of not more than 2.5% in undivided preparations have an effectiveness and composition comparable to those of codeine and dihydrocodeine preparations, which are at present classified in Schedule III of the Single Convention on Narcotic Drugs, 1961. A similar classification of such preparations of nicodicodine would seem appropriate.